SAMPLING OF BITUMINOUS PAVING MIXTURES FOP FOR AASHTO T 168

Scope

This procedure covers the sampling of bituminous paving mixtures in accordance with AASHTO T 168. The sampling of aggregate used in bituminous paving mixtures shall be in accordance with the FOP for AASHTO T 2.

Apparatus

- Flat-bottomed scoop 150 x 400 x 100 mm (6 x 16 x 4 in.) if sampling from a roadway
- Shovel
- Sample containers: such as cardboard boxes, metal cans, stainless steel bowls, or other agency-approved containers
- Template to match conveyor belt shape
- Scoops, trowels, or other equipment to obtain mix
- Sampling plate: heavy gauge metal plate 380 mm x 380 mm (15 in x 15in) minimum 8 gauge thick with a wire attached to one corner long enough to reach from the center of the paver to the outside of the farthest auger extension. Holes ¼ in diameter should be provide in each corner.
- Cookie cutter sampling device: A 330mm (13 in.) square sampling template, constructed from 75mm x 50mm x 3mm (3 in. x 2 in. x 1/8 in.) formed steel angle with two 100mm x 150 mm x 9mm (4 in. x 6 in. x 3/8 in. handles. See diagram.

General Comments

1. Sampling is as important as testing, and every precaution must be taken to obtain a truly representative sample.
2. Care shall be taken to prevent contamination of bituminous mixes by dust or other foreign matter, and to avoid segregation of aggregate and bituminous materials.
3. Samples of mix upon which acceptance or rejection is based shall be selected at random, and may be obtained by, or under the observation of, the purchaser or authorized representative.
4. Some agencies require mechanical sampling devices for hot mix asphalt (HMA) and cold feed aggregate on some projects. These are normally permanently attached devices that allow a sample container to pass perpendicularly through the entire stream of material or divert the entire stream of material into the container. Operation may be hydraulic, pneumatic, or manual and allows the sample container to pass through the stream twice, once in each direction, without overfilling. Special caution is necessary with manually operated systems since a consistent speed is difficult to maintain and non-representative samples may result. Check agency requirements for the specifics of required sampling systems.

Sample Size

Sample size depends on the test methods specified by the agency for acceptance. Check agency requirement for the size required. Commonly, 10 kg are required for determining asphalt cement binder content by the ignition method (AASHTO T 308) and up to 20 kg (45 lb) may be required when using the nuclear method (WAQTC TM 4).

Sampling

- **General**
  1. The material shall be inspected to determine variations. The seller shall provide equipment for safe and appropriate sampling including sampling devices on plants, when required.
  2. Place dense graded mixture samples in cardboard boxes, stainless steel bowls or other agency approved containers. Place open graded mixture samples in stainless steel bowls. Do not put open graded mixture samples in boxes until they have cooled to the point that bituminous material will not migrate from the aggregate.

- **Sampling from a Conveyor Belt**
  1. Stop the conveyor belt.
  2. Select at least three areas of approximately equal size on the belt for sampling.
  3. Insert templates, the shape of which conform to the shape of the belt, in each of the locations to be sampled.
  4. Obtain three approximately equal increments of material that will form a sample of the required size when combined.
  5. Scoop all material between templates into a suitable container.

- **Attached Sampling Devices**
  1. When using an attached sampling device, pass the container twice through the material perpendicularly without overfilling the container.

- **Sampling from Truck Transports**
  1. Obtain samples in four approximately equal increments from haul units.
  2. Obtain each increment from approximately 300 mm (12 in.) below the surface, in each of the four quadrants of load.
  3. Combine the increments to form a sample of the required size.

- **Sampling from a Paver**
  1. Obtain samples from the end of the auger, using a square point shovel.
  2. Place the shovel in front of the auger extension, with the blade flat upon the surface to be paved over.

3. Allow the front face of the auger stream to cover the shovel, and remove the shovel before the auger reaches the shovel by lifting it upward as vertically as possible.
4. Repeat the procedure to obtain a sample of the required size.

- **Sampling from a Roadway Prior to Compaction (Scoop Method)**

1. Obtain samples in approximately equal increments, after placement and prior to rolling, using the scoop.
2. Make a vertical face with the shovel about 750 mm (30 in.) parallel with centerline.
3. Pull the material back approximately 300 mm (12 in.).
4. Place the scoop on the pavement or base as flat as possible at one side of the vertical face and fill the scoop. Make sure that sufficient pressure is exerted on the scoop to remove all of the material to its full depth.
5. Close the lid and remove the scoop when it is full.
6. Repeat Steps 2 through 5 to obtain the required sample size.

- **Sampling from Roadway Prior to Compaction (Plate Method)**

Plate Method using the "Newmoor cookie cutter" sampling device.

There are two conditions that will be encountered when sampling Hot Mix Asphalt (HMA) from the roadway prior to Compaction. The two conditions are:

1. Laying HMA on grade, or untreated base material.
2. Laying HMA on existing asphalt or laying a second lift of HMA.

Method 1 will require the use of a Plate placed on the existing surface in front of the paving machine and sampling using the "Newmoor cookie cutter" sampling device.

Method 2 requires only the use of the "Newmoor cookie cutter" sampling device.

SAFETY:

Condition 1 requires a plate to be placed in the roadway in front of the paving operation and therefore there is always concern with moving, operating equipment. It is safest to stop the paving train while a plate is installed in front of the paver. When this is not possible the following safety rules must be followed.

1. The plate placing operation must be at least 10 feet in front of the paver or pickup device. The technician placing the plate must have eye contact and communication with the paving machine operator. If eye contact cannot be maintained at all time, a third person must be present to provide communication between the operator and the technician.
2. No technician is to be between the asphalt supply trucks and the paving machine. The exception to this rule is if the supply truck is moving forward creating a wind row, in which case the technician must be at least 10 feet behind the truck.
3. At any time the Engineer feels that the sampling technique is creating an unsafe condition, the operation is to be halted until it is made safe or the paving operation will be stopped while the plate is being placed.

Condition 2 is performed behind the paving machine and in front of the breakdown roller. For safety , the roller must remain at least 10 feet behind the sampling operation until the sample has been taken and the hole filled with lose HMA.

Method 1 - Obtaining a Sample on Untreated Base:

1. Following the safety rules detailed above, the technician is to
   - smooth out a location in front of the paver at least two feet inside the edge of the mat,
   - lay the plate down diagonally with the direction of travel, keeping it flat and tight to the base,
   - with the lead corner facing the paving machine.
2. Secure the plate in place by driving a 20-penny nail through the hole in the lead corner of the plate.
3. Pull the wire, attached to the outside corner of the plate, taunt past the edge of the HMA mat and secure with a 16-penny nail.
4. Let the paving operation proceed over the plate and wire. Immediately proceed with the sampling.
5. Using the exposed end of the wire, pull the wire up through the fresh HMA to locate the corner of the plate. Place the "cookie cutter" sample device, just inside the end of the wire, align the cutter over the plate. Press 'cookie cutter device down through the HMA to the plate.
6. Using a small square tipped shovel and/or scoop, carefully remove all the HMA from inside of the cutter and place in a sample container.
7. Remove the sample cutter and the plate from the Roadway. The hole made from the sampling must be filled with loose HMA.

Method 2 - Obtaining a Sample on Asphalt Surface:

1. After the paving machine has gone past the sampling point, immediately place the "cookies cutter" sampling device on the location to be sampled. Push the cutter down through the HMA until it is flat against the underlying asphalt mat.
2. Using a small square tipped shovel and/or scoop, carefully remove all the HMA from inside of the cutter and place in a sample container. The hole made from sampling must filled with loose HMA.

Note 1: It is recommend that the contractor replace the material in hole left from sampling

Identification and Shipping

1. Identify sample containers as required by the agency.
2. Ship samples in containers that will prevent loss, contamination, or damage.